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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,648	02/18/2004	Der-Zheng Liu	REAP0531USA	8923
27765	7590	06/05/2009	EXAMINER	
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			PATHAK, SUDHANSHU C	
			ART UNIT	PAPER NUMBER
			2611	
			NOTIFICATION DATE	DELIVERY MODE
			06/05/2009	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/779,648	<b>Applicant(s)</b> LIU ET AL.	
	<b>Examiner</b> SUDHANSHU C. PATHAK	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6,8,9,11-14 and 16-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,8,9,11-14 and 16-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

1. Claims 1-6, 8-9, 11-14, 16-29 are pending in the application.
2. Claims 7, 10, 15 have been canceled.

***Response to Arguments***

3. Applicant's arguments, filed in amendment dated 03/04/2009, with respect to the 101 Rejections have been fully considered and are persuasive i.e. the claims have been amended appropriately. Therefore the rejections have been withdrawn.
4. Applicant's arguments with respect to Claim Rejections have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Masato et al. (Japanese Publication Number: 2001-053712 (English machine translation)).

In regards to Claim 6, Masato discloses an apparatus (method) for phase compensation at a receiver of a communication system (Drawing 3), wherein a symbol signal modulated by a carrier is transmitted via a plurality of subchannels (Paragraph 2) {Interpretation: The reference discloses an OFDM technique which transmits a symbol via plurality of subchannels}, wherein the symbol signal

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comprises a pilot signal and the subchannels comprise at least a pilot subchannel for transmitting the pilot signal (Paragraph 3, lines 7-21 & Paragraph 20 & Drawing 3, elements 204, 207) {Interpretation: The reference discloses a pilot subcarrier for transmitting a pilot signal}, the apparatus comprising: a carrier frequency offset compensator to perform a carrier frequency offset compensation on the symbol signal (Drawing 3, element 201 & Drawing 4, element 301); a channel compensator to perform a channel compensation on the symbol signal (Drawing 3, element 203) {Interpretation: the reference discloses determining the channel transfer function for every subcarrier including each pilot subcarrier, thus also for a plurality of subcarriers}; a phase error estimator for extracting the pilot signal and generating an estimated residual phase error between the extracted pilot signal and an original pilot signal (Drawing 3, element 204-205 & Drawing 4, elements 304, 306-308 & Paragraph 20, lines 8-12 & Paragraph 21 & Paragraph 25, lines 8-11 & Paragraph 3, lines 21-24); a buffer for storing the estimated residual phase error (Drawing 4, element 309) {Interpretation: The accumulator is interpreted to include a buffer}; and a phase rotator, coupled to the buffer, for compensating a following symbol signal according to the estimated residual phase error (Drawing 3, element 206 & Drawing 4, element 305 & Paragraph 20, lines 12-14 & Paragraph 21 & Paragraph 25, lines 15-20 & Paragraph 26); wherein the following symbol signal is compensated by the channel compensator after being compensated by the phase rotator (Drawing 3, elements 207-209 & Drawing 4, elements 3011-3015 & Paragraph 22 & Paragraph

27) {Interpretation: The reference discloses performing weighting using the channel transfer function for every subcarrier determined in the channel equalizing circuit}.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 3-5, 9-13, 15-19 (apparatus) & 20-21, 23-29 (method) are rejected under 35 U.S.C. 103(a) as being unpatentable over Masato et al. (Japanese Publication Number: 2001-053712 (English machine translation)) in view of Hamaguchi (JP 409093302A (English Translation – Abstract)).

In regards to Claims 1, 4-5, 9, 11-12, 15-20 & 23-26, Masato discloses an apparatus (method) for carrier frequency offset compensation at a receiver of a communication system (Drawing 3), wherein a symbol signal modulated by a carrier is transmitted via a plurality of subchannels (Paragraph 2) {Interpretation: The reference discloses an OFDM technique which transmits a symbol via plurality of subchannels}, wherein the symbol signal comprises a pilot signal and the subchannels comprise at least a pilot subchannel for transmitting the pilot signal (Paragraph 3, lines 7-21 & Paragraph 20 & Drawing 3, elements 204, 207) {Interpretation: The reference discloses a pilot subcarrier for transmitting a pilot signal}, the apparatus comprising: a pilot subchannel estimator for generating an estimated frequency response of the pilot signal (Drawing 3, element 203 &

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Paragraph 20, lines 4-8 & Paragraph 3, lines 15-19) {Interpretation: the reference discloses determining the channel transfer function for every subcarrier including each pilot subcarrier, thus also for a plurality of subcarriers}; a frequency offset estimator, coupled to the pilot subchannel estimator, for generating an estimated carrier frequency offset according to a phase error of the estimated frequency response of the symbol signal, in a frequency domain and a reference signal frequency response (Drawing 3, element 202, 204-205 & Drawing 4, elements 302, 304, 306-308 & Paragraph 20, lines 8-12 & Paragraph 21 & Paragraph 25, lines 8-11 & Paragraph 3, lines 21-24) {Interpretation: The reference discloses performing frequency offset estimation after performing a FFT operation thus the signal(s) are in the frequency domain}; a phase accumulator, coupled to the frequency offset estimator, for calculating an accumulated phase rotation according to the estimated carrier frequency offset (Drawing 4, element 309); and a phase rotator, coupled to the phase accumulator, for carrier frequency offset compensation according to the accumulated phase rotation (Drawing 3, element 206 & Drawing 4, element 305 & Paragraph 20, lines 12-14 & Paragraph 21 & Paragraph 25, lines 15-20 & Paragraph 26); wherein the following symbol signal is compensated by the channel compensator after being compensated by the phase rotator (Drawing 3, elements 207-209 & Drawing 4, elements 3011-3015 & Paragraph 22 & Paragraph 27) {Interpretation: The reference discloses performing weighting using the channel transfer function for every subcarrier determined in the channel equalizing circuit}.

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However, Masato does not disclose performing frequency offset between frequency response of consecutive symbols.

Hamaguchi discloses determining frequency offset estimate, with pilot symbols, for generating an estimated carrier frequency offset according to a phase error of the consecutive pilot symbol (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Hamaguchi teaches determining frequency offset estimate, with pilot symbols, for generating an estimated carrier frequency offset according to a phase error of the consecutive pilot symbol and this is implemented in the apparatus as described in Masato so as to be able to increase the reliability of the received signal and further avoid having to save a reference signal, thus further reducing the complexity of the receiver. However, Masato in view of Hamaguchi does not explicitly disclose a buffer for storing the symbol signal after carrier frequency offset compensation. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that there is no criticality in storing the symbol signal in a buffer after carrier frequency offset, this is a matter of design choice based on the ability to store the data for processing not in real-time, with increased processing.

In regards to Claims 3, 13 & 21, Masato in view of Hamaguchi discloses an apparatus for carrier frequency offset compensation at a receiver of a communication system as described above. Masato further discloses the phase rotator for carrier frequency offset compensation is executed in frequency-domain (Drawing 3, elements 202, 206).

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9. Claims 2, 14 (apparatus) & 22 (method) are rejected under 35 U.S.C. 103(a) as being unpatentable over Masato et al. (Japanese Publication Number: 2001-053712 (English machine translation)) in view of Hamaguchi (JP 409093302A (English Translation – Abstract) and further in view of Frank et al. (7,324,599).

In regards to Claims 2, 14 & 22, Masato in view of Hamaguchi discloses an apparatus (method) for carrier frequency offset compensation at a receiver of a communication system as described above. However, Masato in view of Hamaguchi does not disclose the phase rotator for carrier frequency offset compensation is executed in time-domain.

Frank discloses an apparatus (method) and apparatus for correcting the frequency deviations of signals in a multicarrier system, such as an OFDM-system (Abstract, lines 1-5 & Column 1, lines 25-40 & Column 2, lines 22-30). Frank further discloses the phase rotator for carrier frequency offset compensation is executed in time-domain (Abstract, lines 6-20 & Fig. 3, elements 16, 24, 6 & Column 5, lines 4-12, 53-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Frank teaches the phase rotator for carrier frequency offset compensation is executed in time-domain and this is implemented in the apparatus as described in Masato in view of Hamaguchi so as to be able to perform frequency offset compensation before performing OFDM demodulation so as to determine a more accurate data and reduce the effects of demodulation on the frequency offset.



***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUDHANSHU C. PATHAK whose telephone number is (571)272-5509. The examiner can normally be reached on 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on 571-272-3042.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sudhanshu C Pathak/  
Primary Examiner, Art Unit 2611